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Fig .1

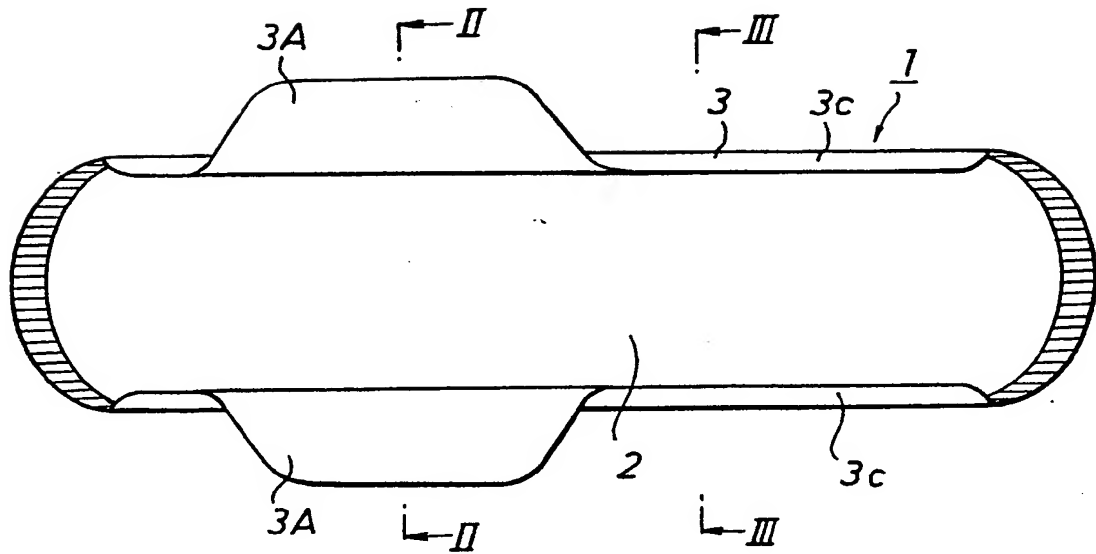


Fig .2

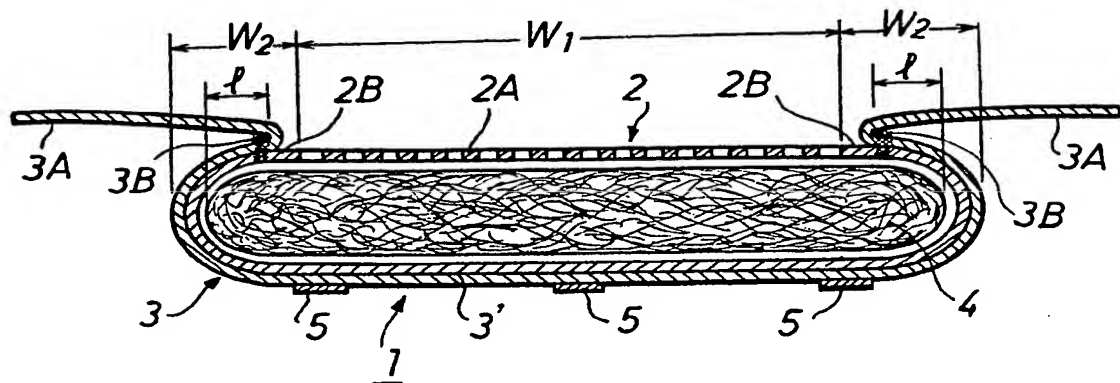
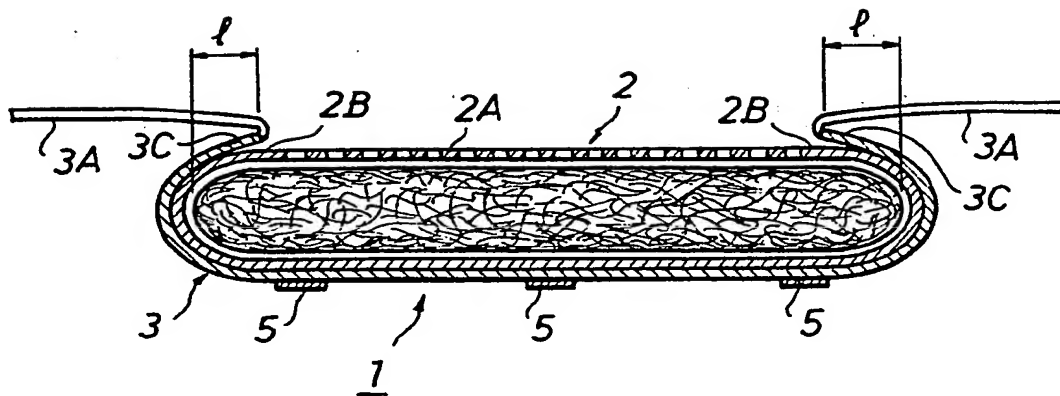


Fig . 3



**Fig .4**

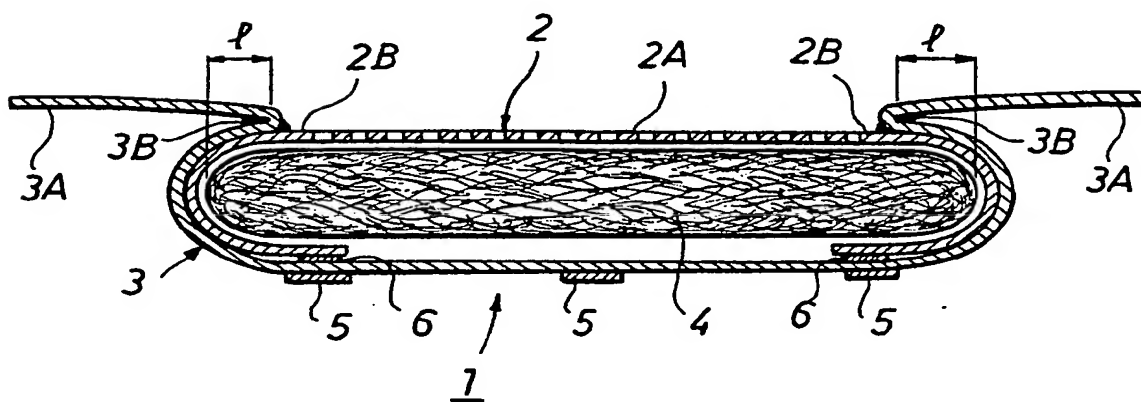


Fig .5

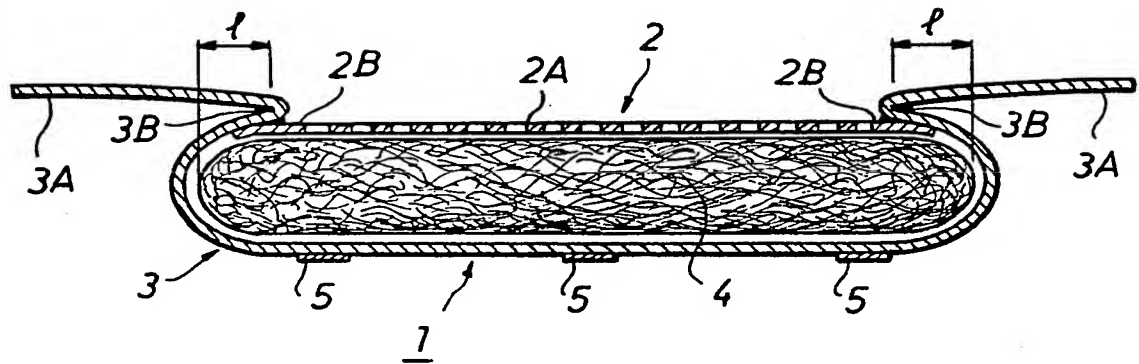


Fig .6

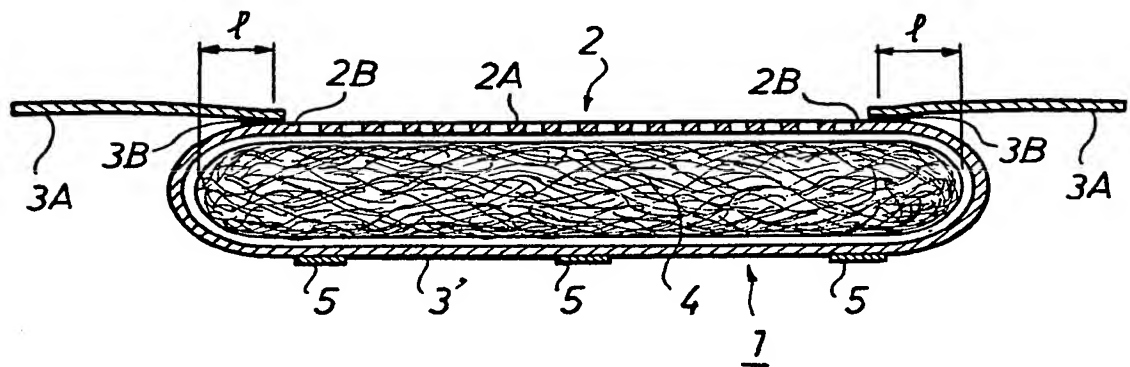


Fig .7

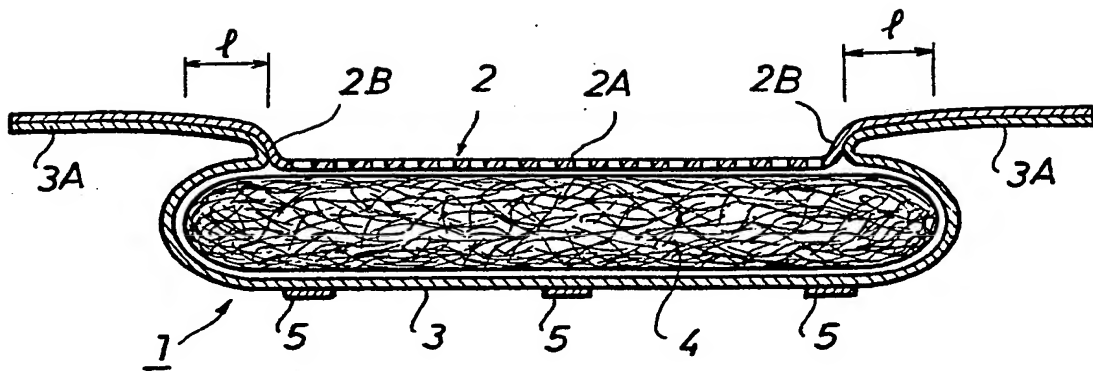
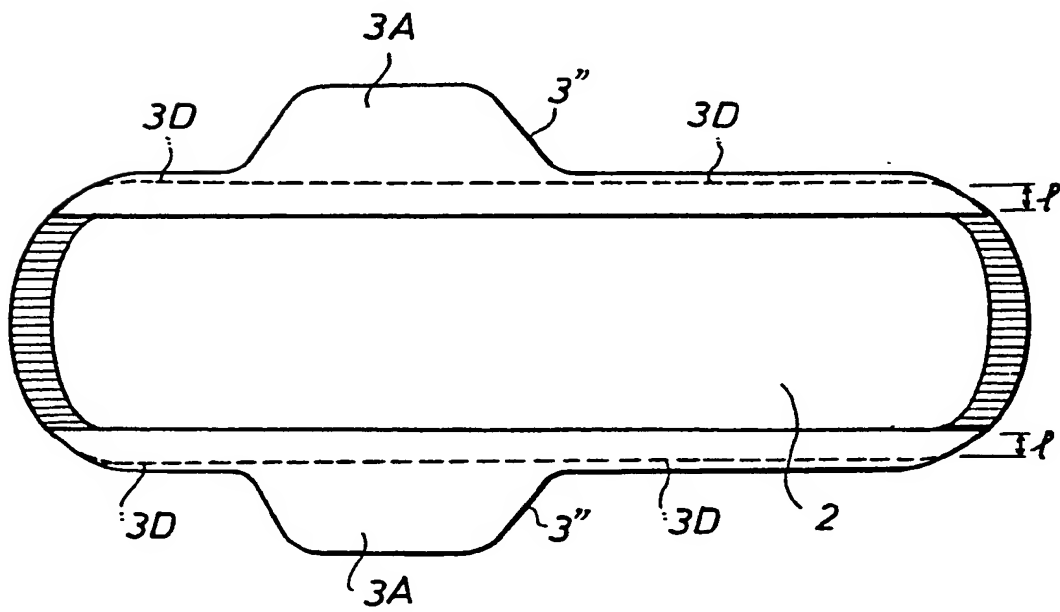


Fig .8



## ABSORBENT ARTICLE

This invention relates to an absorbent article such as a catamenial napkin, sanitary towel, incontinence pad or the like which a user wears together with or within an undergarment (hereinafter referred to as "briefs") in the crotch region thereof.

Conventional absorbent articles, such as catamenial napkins, basically include a liquid permeable outer or top sheet, a liquid impermeable antileakage sheet and a liquid retentive absorbent element therebetween. Attempts have been made to improve the absorption ability of such absorbent articles by introducing new materials such as absorbent polymers, hydrophobic outer sheets and the like.

However, even in an absorbent article whose various component parts have a high efficiency due to the introduction of new materials, leakage still occurs from the crotch portion and hip portion in actual use and the absorbent article does not fully realise its potential efficiency.

The chief causes of such leakage are as follows:

1. The absorbent article becomes displaced from its desired wearing position due to the irregular forces acting on it due to the physical activity of the wearer.
2. As a result of such irregular forces, the absorbent article becomes twisted or deformed and, as a result, a gap is created between the user's body and



the absorbent article.

3. A further result of the irregular forces is that both side edge portions of the absorbent article are crumpled or wrinkled toward the central portion thereof and the width of the absorbent element is substantially decreased.

Leakage caused by the above factors is greatly affected by the size of the briefs worn by the user. For example, this effect is very marked when the user's briefs are not a snug fit and leakage readily occurs even if the absorbent element has a comparatively small liquid absorption capacity. On the other hand, briefs which are truly a snug fit create an unpleasant sensation of tightness or of becoming too hot.

Many proposals have been made, in order to solve these problems in absorbent articles, in which a pair of flexible flaps (lugs) extend outwardly in the width direction away from the centre of each side of the absorbent articles (Japanese Early Laid-open Publication Nos. Sho 60-75058 and Hei 1-111002). In order to improve the antileakage ability of such absorbent articles, they are retained in position by wrapping the lugs around the briefs and fixing them in position.

These absorbent articles are able to effectively prevent leakage caused by factors 1 and 2 referred to above to some extent provided that the absorbent articles are correctly fitted in the right position. However, it has recently been realised that a problem still remains with regard to factor 3 above and with

regard to deformation of the flaps. For example, if the briefs are not a snug fit with the user's body or if the width of the crotch portion is larger than that of the briefs there is still the problem that leakage can not necessarily effectively be prevented because the lugs are turned up by twisting of the absorbent article caused by physical activity or movement of the wearer.

The object of the present invention is to provide an absorbent article, in which displacement and twisting is restricted by not permitting the lugs to twist and the desired position of the absorbent article is maintained by the lugs, and which may be intimately attached to the crotch portion of briefs thereby enabling the leakage of body fluids to be effectively prevented.

After an extensive study of absorbent articles with lugs, the inventor has appreciated that the above object can be achieved by varying the way in which the lugs are attached and, particularly, the positions in which the lugs are attached.

According to the present invention there is provided an absorbent article of generally elongate shape including a top sheet having a liquid permeable area, a liquid impermeable sheet and a liquid retentive absorbent element interposed between them together forming an absorbent pad, the absorbent article further including a pair of lugs extending outwardly in the width direction of the absorbent pad and connected to the top sheet at positions spaced inwardly from the longitudinal side edges of the absorbent element.

In use, the absorbent article is placed within briefs and optionally secured to the crotch portion thereof by means of one or more adhesive areas which are preferably provided on the outer surface of the liquid impermeable sheet. The lugs are pulled out from the crotch portion of the briefs so that the area of the absorbent article between the lugs is positioned adjacent the source of the body liquid and maintained in that position thereby retaining the absorbent article in intimate contact with the correct portion of the user's body.

Further features and details of the present invention will be apparent from the following description of certain specific embodiments of the invention which is given by way of example with reference to the accompanying drawings, in which:-

Figure 1 is a plan view showing the inner surface, which is to contact the user's body, of a first embodiment of absorbent article according to the present invention;

Figure 2 is a sectional view on the line II-II in Figure 1;

Figure 3 is a sectional view on the line III-III in Figure 1;

Figures 4, 5, 6 and 7 are views corresponding to Figure 2 showing second, third, fourth and fifth embodiments, respectively, of absorbent article in accordance with the present invention; and

Figure 8 is a view corresponding to Figure 2, showing a sixth embodiment of the present invention.

The absorbent article 1 of the first embodiment, as shown in Figures 1 and 2, is of generally elongate shape and comprises a top sheet 2 having a liquid permeable portion for contacting the user's skin and for permeating body fluids such as menses, an antileakage or liquid impermeable sheet 3 for contacting the user's briefs and for preventing leakage of body fluids, and a liquid retentive absorbent element 4 interposed between them. Furthermore, a pair of lugs or flaps 3A extend outwardly in the width direction from the absorbent article 1, affixed to the outer surface of the top sheet 2 at positions laterally inside the longitudinal edges of the absorbent element 4.

The top sheet 2 of the first embodiment surrounds the entire surface of the absorbent element 4. It has a liquid permeable portion 2A on its upper outer surface, which, in use, contacts the user's skin, and liquid impermeable portions 2B on both sides, in the longitudinal direction, of the liquid permeable portion 2A which are connected by a liquid impermeable portion 3'. Known materials such as net and film formed of non-woven fabric or perforated hydrophobic film having perforations can be used as the top sheet 2. Those described in Japanese Patent Publication No. Hei 1-119251 are preferable.

Though not visible, if the liquid permeable portion 2A were magnified it would preferably be seen to comprise top portions, bottom portions and wall portions for connecting the top portions with the bottom portions,

and have an irregular structure provided with through-holes formed in the bottom portions and/or wall portions and adapted to permit body fluids to pass therethrough, only at least a part of the wall portions being provided with the perforations. Body fluid permeates through the perforations in the liquid permeable portion 2A and the remaining portion prohibits the fluid from returning, thus providing an efficient liquid block efficiency and a feeling of dryness after the body fluid has been absorbed. The perforations are dimensioned and spaced having regard to the balancing of the permeability of the body fluid, preventing the fluid from returning, and the requisite blocking efficiency. They are preferably of 0.1 to 2mm diameter and a density of 10 to 100/cm<sup>2</sup>.

The width  $W_1$  of the liquid permeable portion 2A can be changed depending on the width of the absorbent article 1. It is preferably either equal to the width (normally 60 to 80mm) of the crotch portion of the briefs with which they will be worn or slightly narrower, e.g. 35 to 80mm, preferably 50 to 75mm. If the width  $W_1$  is less than 35mm, there is a risk that a liquid impermeable portion 2B will come into registry with the source of body fluid, thus resulting in leakage. On the other hand, if the width  $W_1$  exceeds about 80mm, the liquid permeable portion 2A tends to be wider than the crotch portion of the briefs so that the side edge portions of the absorbent article 1 tend to become twisted or attached to the central portion of the absorbent article which results in the transfer of absorbed fluid between the contacting portions, decreased absorptive capacity and physical discomfort.

The width  $W_2$  of each of the liquid impermeable portions 2B, 2B is preferably 2 to 20mm, and more preferably 3 to 10mm. If the width  $W_2$  is less than 2mm, an asymmetrical force is applied to the absorbent article 1, when fitted to the briefs, due to the user's physical activity and body fluid leaks from the perforations at both side edges of the liquid permeable portion 2A. On the other hand, if the width  $W_2$  exceeds 20mm, the liquid permeable portion 2A tends to be too narrow.

The liquid permeability may also be controlled and liquid return through the top sheet 2 prevented by a hydrophilic treatment of the top sheet by application of a surface active agent, a physical treatment such as irradiation, chemical treatment such as mineral acid treatment, or the like. Water repellency may also be imparted by means of application of a chemical agent of silicon or fluorine-containing type. The feeling and appearance of the top sheet 2 can be improved by a calendar treatment and embossing a pattern according to requirements. Also advantageous from the point of view of speed of absorption is a sheet obtained by integrally forming a film with an aggregate of hydrophilic fibres such as, for example, laminated non-woven fabric, laminated paper and the like.

The antileakage sheet 3 extends around the back and both edge portions in the longitudinal direction of the absorbent element 4 with the interposition of the top sheet 2 and reaches the liquid impermeable portions 2B disposed in the surface which contacts the user's body

of the top sheet 2 and is there connected to those portions by adhesive, ultrasonic welding or the like, as shown in Figure 2.

The antileakage sheet 3 is folded outwardly in the width direction of the absorbent member 4 at the connection areas, which constitute fixed points 3B, to form the pair of lugs 3A. Each of the fixed points 3B is located inside the associated side edge of the absorbent body 4 by a distance 1 which is preferably 5 to 15mm. The briefs can be reliably fixed to the crotch portion by providing an adhesive area on each lug 3A on the antileakage sheet 3 side and the displacement prevention effect can thus be enhanced. By fixing the pair of lugs 3A in the described positions, the absorbent element can be prevented from being twisted and liquid can be prevented from leaking at the time of fitting the absorbent article.

Since each of the lugs 3A exerts a fixing or retaining force on the crotch portion of the absorbent article in a position in which it is pulled out from each edge of the crotch portion of the briefs, the position of each lug 3A is preferably offset forwardly in the longitudinal direction of the absorbent article. This results in the liquid permeable portion 2A between the lugs 3A, 3A being generally coincident with the source of the body liquid and the length of the part of the absorbent element 4 disposed rearwardly of the lugs 3A being larger than that of the remainder of the absorbent element 4, namely the part disposed forwardly of the lugs 3A. As a result, the area of the absorbent element 4 covering the wearer's hip portion is

increased compared with the area covering the wearer's pubis portion, thus enabling leakage to be restrained from the hip portion. The forward offset of each of the lugs 3A is preferably 20 to 40mm from the centre in the longitudinal direction of the absorbent article 1.

Each of the lugs 3A, as is apparent from Figures 1 and 2, is formed by folding back a flap portion which is wider in the direction of the length of the absorbent article than the width of the absorbent element 4 and extends outwardly from the outer surface of the top sheet 2 in the width direction from positions which are inside the associated longitudinal edge of the absorbent element 4. Furthermore, each of the lugs 3A is connected to the underlying portion 3C of the impermeable sheet 3 and the associated impermeable portion 2B to form the linear fixed portions 3B and is thus held in position above the absorbent element 4. It is noted that although the lugs 3A as shown in Figure 2, are affixed to the upper part of the top sheet 2, the edge portions 3C beyond the ends of the lugs are not connected to anything but constitute free edges, as shown in Figure 3.

Accordingly, by pulling out the lugs 3A from the sides of the crotch portion of the briefs and fixing the absorbent article to the crotch portion, the absorbent article 1 can be prevented from being displaced and twisted irrespective of movement of the user and the lugs 3A can be effectively restrained from contacting the outer surface of the absorbent element 4, thus achieving the desired object.



There is no single desirable size for the lugs 3A and an appropriate size may be easily determined taking into account the desired stability when fixed to the briefs, the ease of fixing and the size of the absorbent article 1. For example, in the case of a relatively large absorbent napkin for night use having an absorbent element 4 of about 250mm length and about 70mm width, the lugs 3A are preferably 30 to 70mm long and 25 to 50mm wide. The lugs 3A may be of any suitable material as long as sufficient flexibility to permit them readily to be bent when they have been fixed to the briefs is present. In order to improve their shape stability and feel, a laminated non-woven fabric, a laminated paper or the like, obtained by integrally forming, for example, a film with an aggregate or hydrophilic fibres are preferred. The lugs 3A can be fixed to the top sheet 2 by methods known in the art. However, having regard to manufacturing considerations, the lugs 3A are preferably adhered in a bead shape or spiral shape using a hot melt adhesive. If the feel and appearance of the side edge portions are taken into consideration, the spiral shape is preferable.

A plurality of adhesive areas 5 are formed on that surface of the antileakage sheet 3 which contacts the briefs by applying adhesive to a plurality of areas thereof spaced apart in the longitudinal direction. These adhesive areas 5 serve as fixing means for fixing the absorbent article 1 to the briefs.

When the absorbent article 1 is used, it is affixed to the crotch portion of the briefs by the adhesive

portions 5 and the lugs 3A are pulled out from both sides of the crotch portion of the briefs. The absorbent article 1 is thus fixed in a stable condition in which the liquid permeable portion 2A of the top sheet 2, which is disposed between the fixed portions 3B, is intimately adjacent the desired area of the user's body with the liquid impermeable portions 2B on both sides of the crotch portion. If the user indulges in vigorous activity, the side edge portions of the absorbent article 1 are not displaced or twisted and are held stably generally in their initial position, since the force which holds the briefs intimately adjacent the user's body normally acts directly adjacent the fixed portions 3B through the side edge portions of the crotch portion of the briefs. As a result, the liquid impermeable portions 2B, 2B can effectively exhibit their intended antileakage properties at both side edge portions of the crotch portion of the briefs.

These antileakage properties of the absorbent article of the present invention are particularly promoted by the fact that each lug 3A is affixed in a position which is spaced inwardly, by a distance 1, from the associated side edge of the absorbent element.

The antileakage effect can be further enhanced by applying an adhesive area to each lug 3A on the antileakage sheet 3 side and firmly fixing the lugs 3A to the crotch portion of the briefs.

In the absorbent article 1 of the second embodiment shown in Figure 4, the liquid impermeable portion of

the top sheet 2 is omitted from the underside of the absorbent element 4, and the top sheet 2 extends around the sides of the absorbent element 4 and a short distance beneath it and then terminates in free ends which are connected to the antileakage sheet 3 by connection means 6 such as adhesive, ultrasonic welding or the like.

Similarly, in the absorbent article 1 of the third embodiment shown in Figure 5, the top sheet 2 is omitted from the rear and sides of the absorbent element 4 and extends only over its upper surface. The sides and rear of the absorbent element 4 are thus covered only by the antileakage sheet 4 which is folded as before to form the lugs 3A.

The second and third embodiments are constructed in a very similar manner to the embodiment shown in Figures 1 to 3, and thus substantially the same function and effect can be expected but the amount of the top sheet 2 which is used is reduced.

In the absorbent article 1 of the fourth embodiment shown in Figure 6, the antileakage sheet 3 of the first to third embodiments is replaced by a liquid impermeable portion of the top sheet 2. In this embodiment, the lugs 3A are constituted by separate members and are directly connected to the top sheet 2 at the same positions as in the absorbent article 1 of the previous embodiments by adhesive 6. In other respects, this embodiment is similar to the previous embodiment described in relation to Figures 1 to 3. The antileakage sheet 3 and the impermeable portions 3C

of the top sheet 2 are omitted and the liquid impermeable portion of the top sheet performs the role of the antileakage sheet 3. The same function and effect as in the first embodiment can be expected and the amount of the antileakage sheet which is used is reduced.

The fifth embodiment shown in Figure 7 is again generally similar except that the pair of lugs 3A are each formed of connected portions of the antileakage layer 3 and the top sheet 2. Alternatively, the antileakage material 3 of the lugs 3A can be omitted. Where necessary, the lugs 3A may be fixed at the fixed portions 3B, as in the first embodiment.

In the sixth embodiment shown in Figure 8, a flap 3" is disposed along the entire length of each side of the absorbent article 1 in the longitudinal direction, a part of each flap 3" extending outwardly to form the pair of lugs 3A while the remainder thereof constitutes very small flaps 3D. The flaps 3" including the lugs 3A of this embodiment are constructed in the generally same manner as in the fifth embodiment shown in Figure 7, but they may also be constructed in generally the same manner as in the other embodiments.

It should be noted that the absorbent article of the present invention is not limited to the constructions described above. All that is crucial is that a pair of lugs extend outwardly in the width direction of the absorbent article and are affixed to the upper surface of the top sheet at positions spaced inwardly from the side edges in the longitudinal direction of the

absorbent element.

CLAIMS

1. An absorbent article of generally elongate shape including a top sheet having a liquid permeable area, a liquid impermeable sheet and a liquid retentive absorbent element interposed between them together forming an absorbent pad, the absorbent article further including a pair of lugs extending outwardly in the width direction of the absorbent pad and connected to the top sheet at positions spaced inwardly from the longitudinal side edges of the absorbent element.
2. An absorbent article as claimed in claim 1 in which the lugs are at least partly constituted by part of the liquid impermeable sheet which extends over the underside and side edges of the absorbent element and is folded outwardly to constitute the lugs.
3. An absorbent article as claimed in claim 2 wherein said pair of lugs are affixed at said folded-back portions of said antileakage material.
4. An absorbent article as claimed in claim 2 or claim 3 in which the liquid impermeable sheet extends over the sides and a portion of the top surface of the absorbent element over its entire length, the said portions which extend over the top surface being connected to the top sheet only at the positions at which the lugs are provided.
5. An absorbent article as claimed in any one of claims 1 to 4, in which the lugs are constituted by

portions of the top sheet and portions of the liquid impermeable sheet which are connected together.

6. An absorbent article as claimed in claim 1 in which said pair of lugs are formed by extending both side portions of said outer material.

7. An absorbent article as claimed in claim 1, claim 5 or claim 6, in which the lugs are liquid impermeable.

8. An absorbent article as claimed in any one of the preceding claims in which the lugs are connected to portions of the top sheet which are not liquid permeable.

9. An absorbent article as claimed in one of the preceding claims in which each lug is provided with an adhesive area on that side which is closest to the liquid impermeable sheet.

10. An absorbent article as claimed in one of the preceding claims in which the lugs are connected to the top sheet at positions which are located at positions 5 to 15mm inward from the associated side edge in the longitudinal direction of the absorbent element.

11. An absorbent article substantially as specifically herein described with reference to Figures 1 to 3 or any one of Figures 4 to 8.

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